CASE STUDY · AI-DRIVEN KNITTING OPERATIONS

Finding 2,577 lost machine-hours on a 37-machine knitting floor

How a 28-day shift log became a live control room — and a ranked, owner-by-owner plan to win back non-productive time. AI prepares the evidence; people make the decisions.

Kamal Ahmed · Textile Operations Leader transitioning into AI-Driven Manufacturing

Circular knitting · Shift log 01–28 Sep 2026

58.3%	41.7%	9,640 h	35.1%
COUNT EFFICIENCY · TARGET 65%	NON-PRODUCTIVE TIME	MACHINE-HOURS STOPPED / 28 DAYS	NPT WITH NO REASON CODE

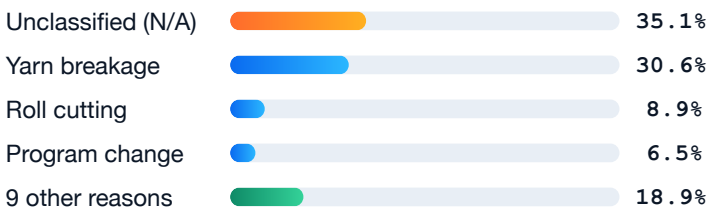
01 · THE PROBLEM

37 circular knitting machines across three shifts reported output daily — but not **why** time was lost. Averages hid chronic under-performers; over a third of stop time was logged "N/A".

02 · WHAT WAS BUILT

A **Knitting Floor Control Room** on **2,887 machine-shifts**: 3D floor, operator view, stop-reason Pareto, control chart with alerts and a what-if simulator. Names are anonymised.

03 · WHERE THE TIME WENT



Four reasons = 81.1% of lost time. Fix the coding first — you cannot manage what is logged as "N/A".

04 · WHAT THE CONTROL CHART FLAGGED

1. **Chronic machines:** one machine ran 13 days in a row below 45% efficiency; three more had 6–8 day runs.
2. **Declining machines:** several lost 9–30 points in the last 7 days versus the prior three weeks.
3. **Sensor fault:** one revolution counter under-reported in 75 of 83 shifts — bad data, not bad performance.
4. **Ownership:** higher operator rotation tracked with lower efficiency (floor-wide r = –0.34).

05 · MODELLED IMPACT (WHAT-IF)

58.3%	→	69.5%
efficiency today		after planned actions

2,577 h	+3.8	+11.2 pts
recovered / 28 days	machines of capacity	vs 65% target

MODELLED ESTIMATE · NOT A GUARANTEED RESULT

06 · COMPANION: KPI PERFORMANCE SYSTEM

80.8% — FY score across **25 people, 18 KPIs, 78 KPI lines**. Q1 **78.0** → Q4 **85.6** (+7.6 pts). Five KPIs — led by grey-fabric T&A (23%) — explain **65%** of the gap to target.

Scored into response bands (recognise · coach · improvement plan) with an owner per improvement lever. Names anonymised.

07 · FOLLOW-UP: TRACKING NPT WITH DEVICES (AUG → OCT 2026)

41.3% → 39.1%	34%	40% vs <2%
NPT of loaded time, Aug → Oct	of NPT minutes still uncoded	stops over 15 min: NPT minutes vs events

NPT devices on the same 37 machines feed a tracker rebuilt in one click from Excel exports, with machine, reason, skills and training views. The fall is **real but modest** and flat since September: next gains are reason-code discipline, long-stop alerts and yarn breakage.

08 · 90-DAY PLAN

DAYS 1–14 · MAKE LOSSES VISIBLE

- Reason code mandatory for stops > 2 min
- Repair sensor and assignment data gaps
- 15-minute daily NPT meeting

DAYS 15–45 · ATTACK TOP LOSSES

- Yarn-breakage task force: lots, tension, cleaning, humidity
- Doffing standard
- Pair low performers with trainers

DAYS 46–90 · LOCK THE GAINS

- SMED changeover kit
- Group orders by gauge and diameter
- Preventive maintenance; monthly limits

AI PREPARES
Summaries, comparisons, exception alerts, draft reports, pattern detection across machines and shifts.

HUMANS DECIDE
Technical decisions, production commitments, rescheduling, coaching and any critical operational action.

Source: anonymised shift log, 37 circular knitting machines, 3 shifts, 01–28 Sep 2026; NPT follow-up from device logs, reliable data from 6 Aug 2026, anonymised. Simulator figures are time-based estimates at current machine speeds; no money values are shown.

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